Fig. 1

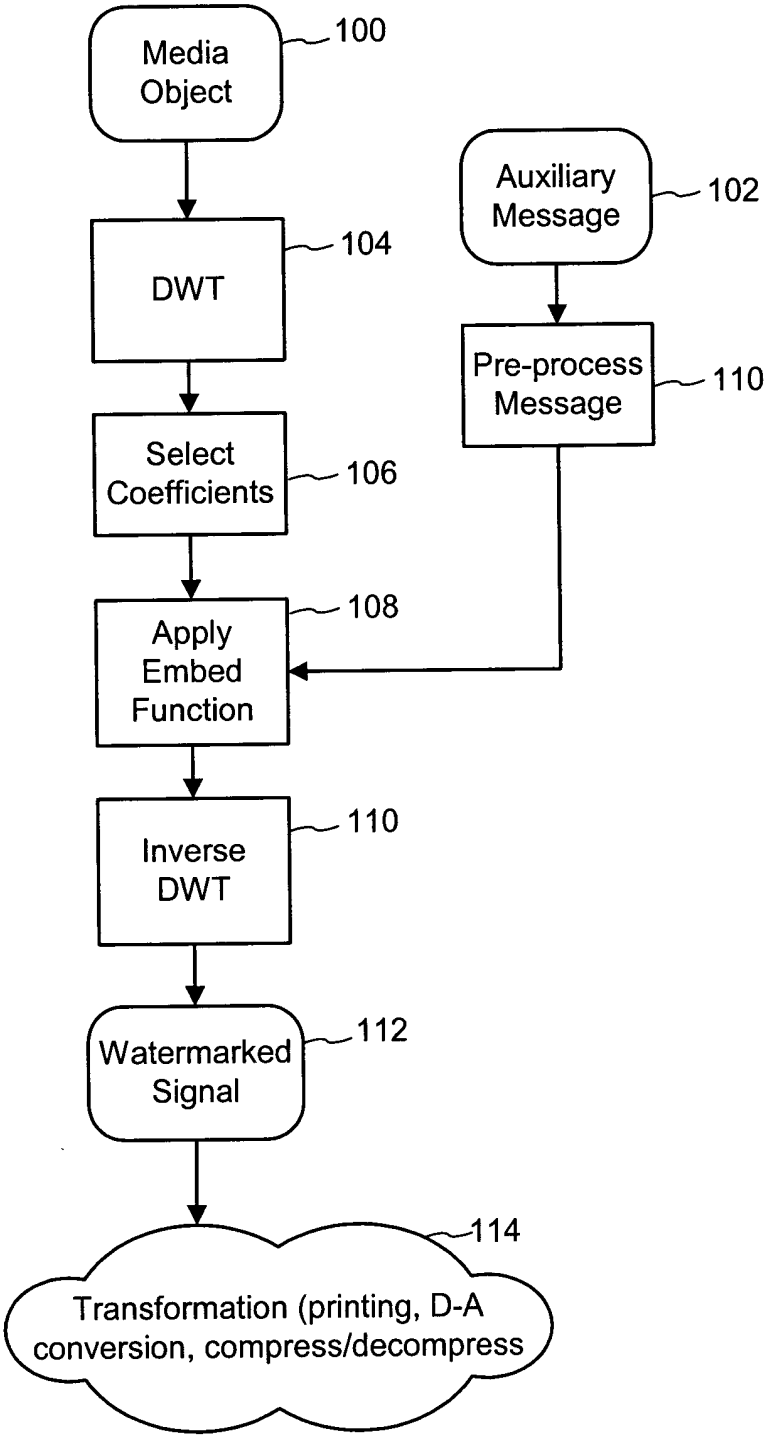

Media Object
100
Auxiliary Message
102
DWT
104
Pre-process Message
110
Select Coefficients
106
Apply Embed Function
108
Inverse DWT
110
Watermarked Signal
112
Transformation (printing, D-A conversion, compress/decompress
114

Fig. 2

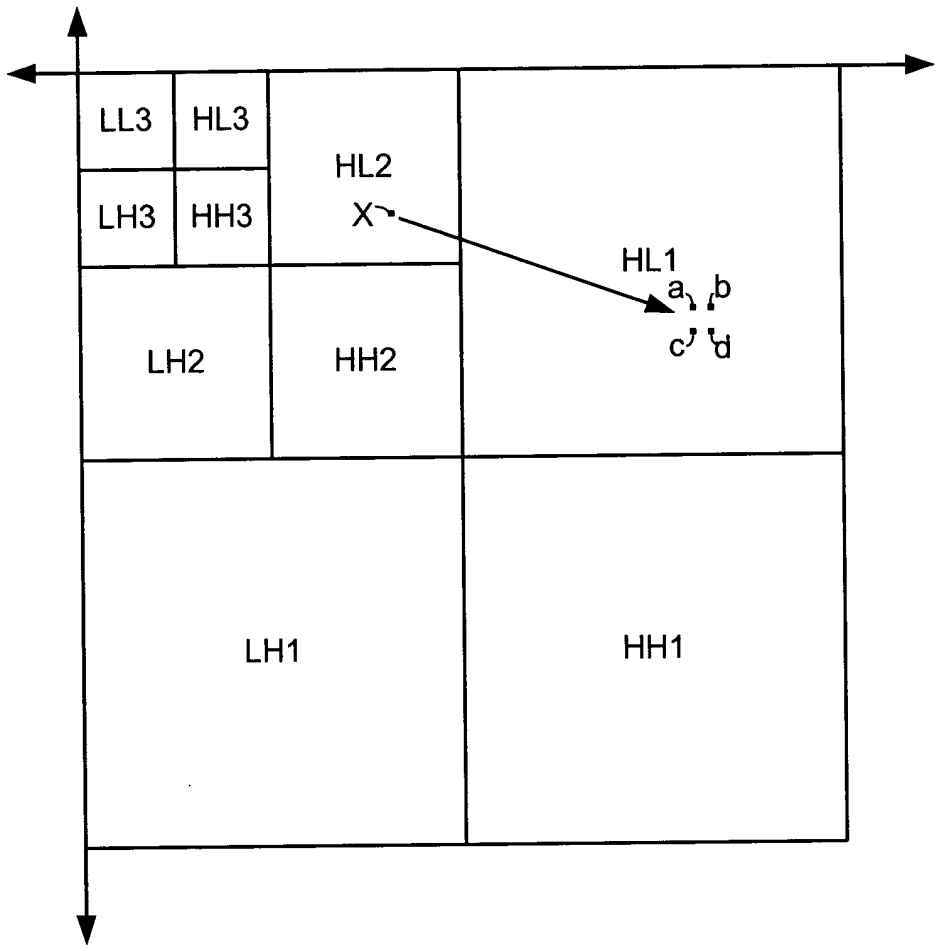


Fig. 3

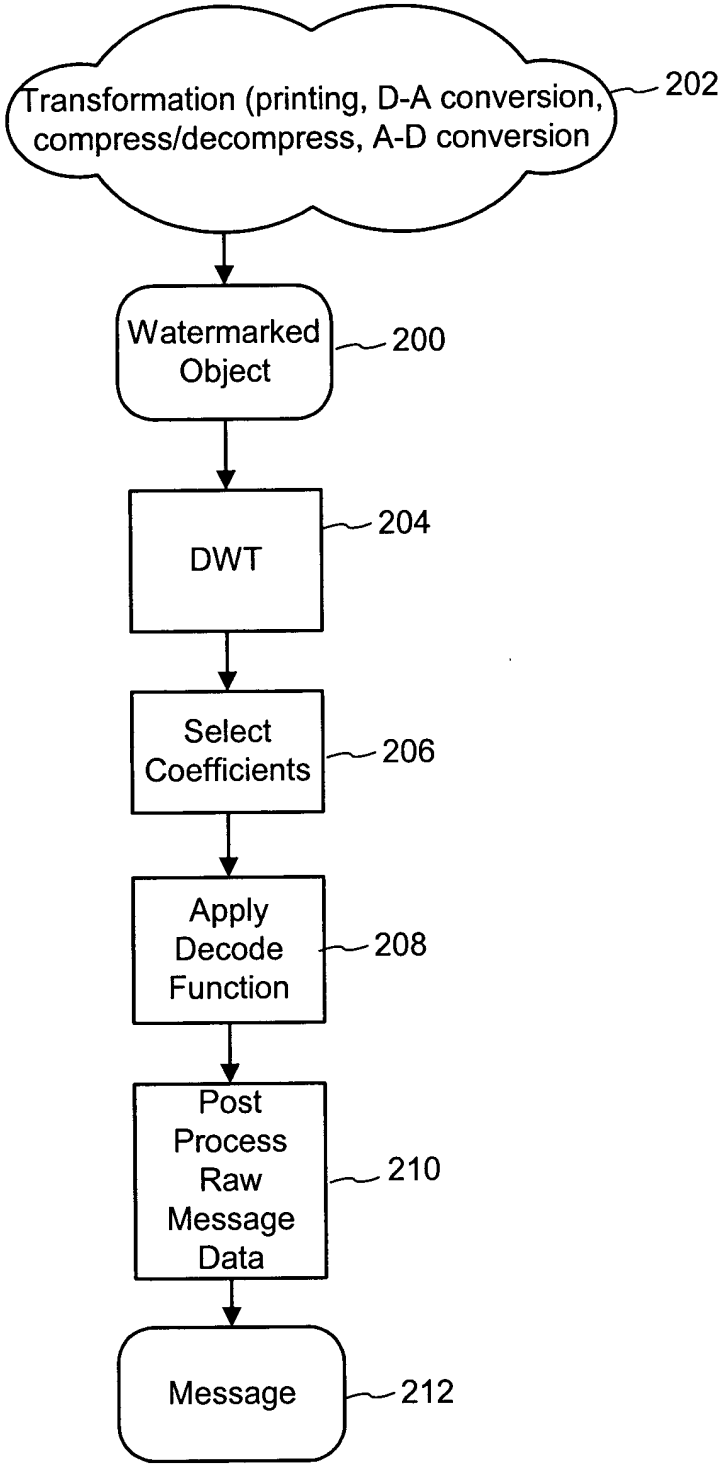
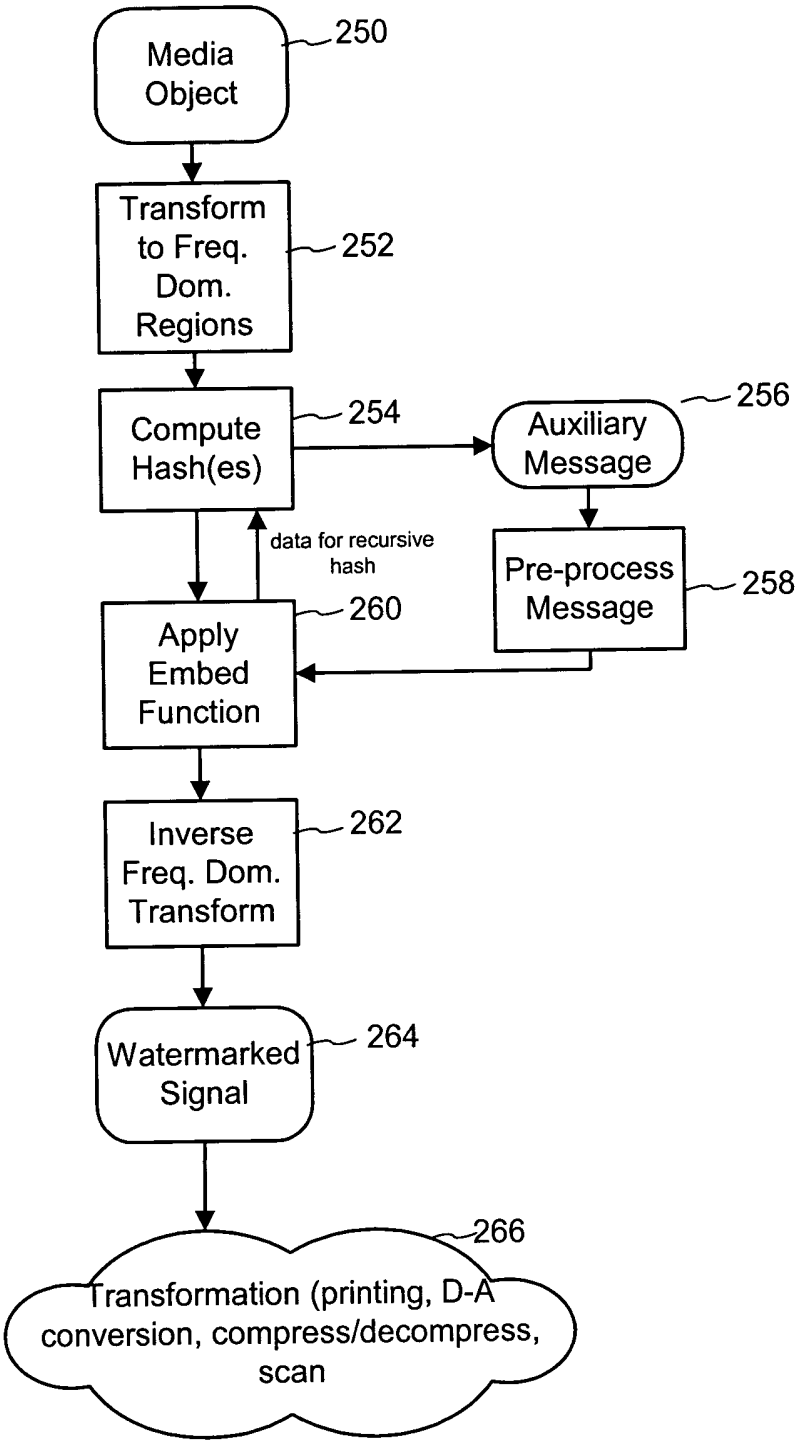

Transformation (printing, D-A conversion, compress/decompress, A-D conversion
202
Watermarked Object
200
DWT
204
Select Coefficients
206
Apply Decode Function
208
Post Process Raw Message Data
210
Message
212

Fig. 4


Media Object
250
Transform to Freq. Dom. Regions
252
Compute Hash(es)
254
Auxiliary Message
256
data for recursive hash
Pre-process Message
258
Apply Embed Function
260
Inverse Freq. Dom. Transform
262
Watermarked Signal
264
266
Transformation (printing, D-A conversion, compress/decompress, scan

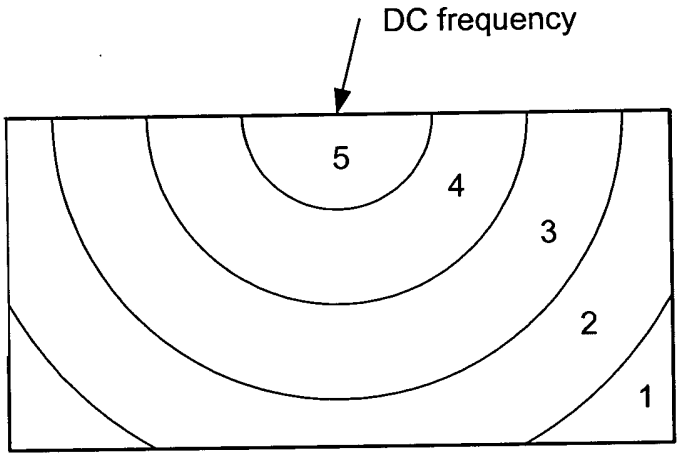
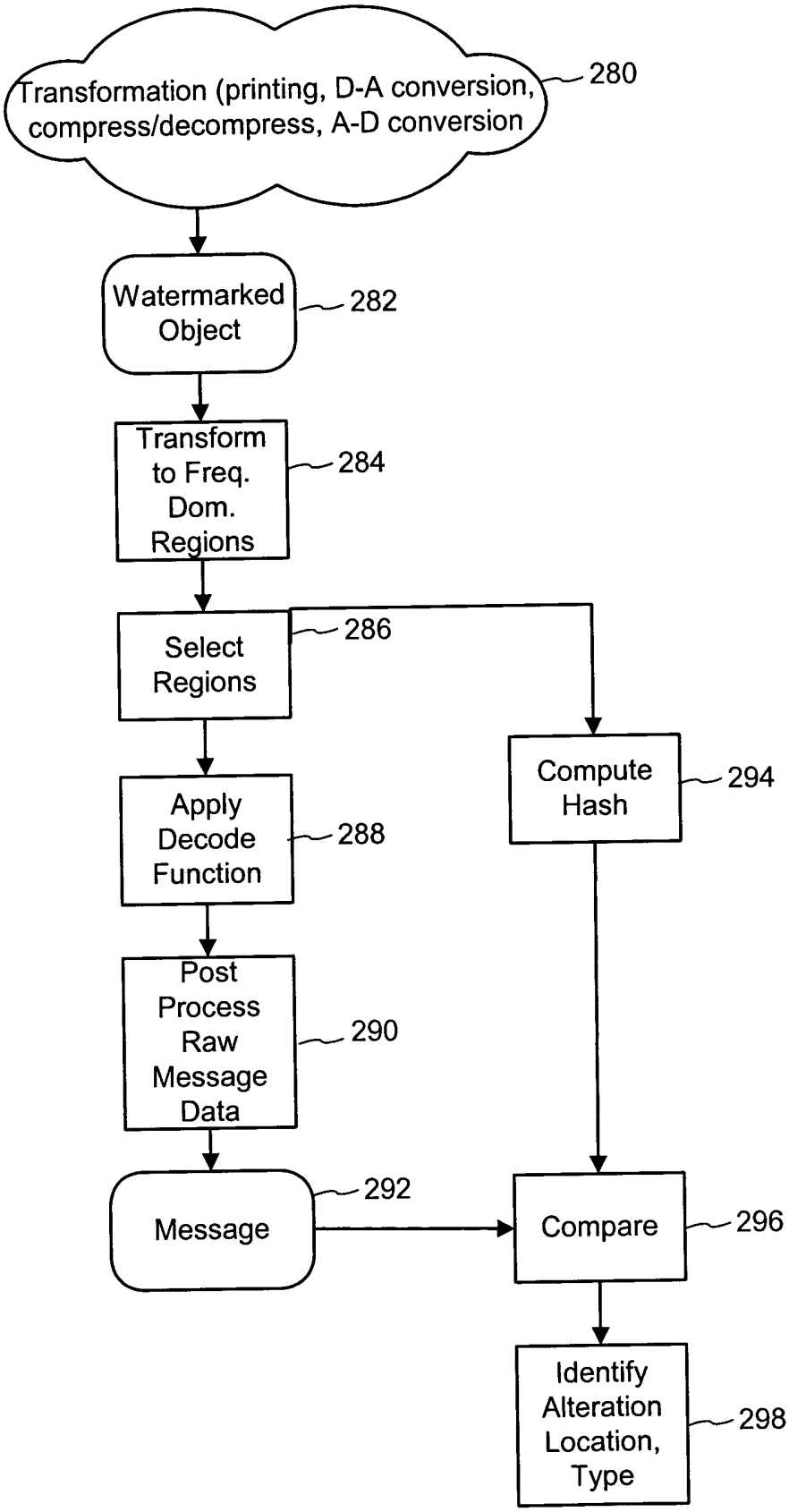


Image Block FFT

Fig. 5

Fig. 6


Transformation (printing, D-A conversion, compress/decompress, A-D conversion
280
Watermarked Object
282
Transform to Freq. Dom. Regions
284
Select Regions
286
Apply Decode Function
288
Post Process Raw Message Data
290
Message
292
Compute Hash
294
Compare
296
Identify Alteration Location, Type
298